

Noise, vibration and axial clearance tester

MVS 130D, MVS 270A



MVS 270A

General description

Measurement of vibration is of great importance when aiming for a high quality bearing production. Some types of vibration are related to diminished bearing life, or can be a source of customer dissatisfaction. Vibrations in bearings are caused by time varying forces in bearing. The contact forces move around the bearing, giving rise to perfect bearing vibrations in the outer ring.

Geometric imperfections which can arise in raceways are:

- Waviness
- Local defects
- Dirt particles
- Roughness
- Form errors
- Cage problems

SKF noise and vibration equipment serves to quantify and trace the reasons for vibrations.

The MVS equipment is designed for measuring axial clearance in spherical rollers and self-aligning ball bearings. Bearings with a cylindrical bore and a tapered bore can be measured.



An electronically-controlled motor drives the spindle, on which the bearing is placed on a mandrel, one for each bearing bore diameter. The advantage of the frequency-controlled motor is that acceleration and retardation can be regulated in order to prevent the bearing from skidding and either becoming damaged itself or damaging the mandrel. Spindle speed for the MVS 130D is 1 800 r/min., for the MVS 270A it is 700 r/min.

The pickups and clearance sensors are mounted on the spindle housing. The spindle and the loading device are mounted on a base

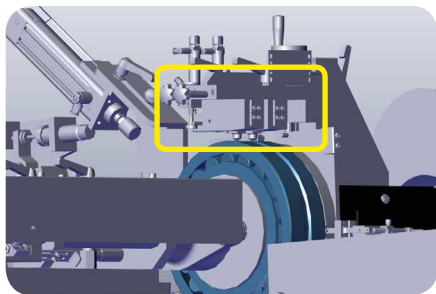
plate which, in turn, is mounted on vibration dampers in order to eliminate vibrations from the surroundings. The loading device consists of a loading tool, one for each bearing type, and two pneumatic cylinders. One cylinder is used to hold the inner ring on the mandrel and one cylinder is used for loading the outer ring in both axial directions.

Machine description

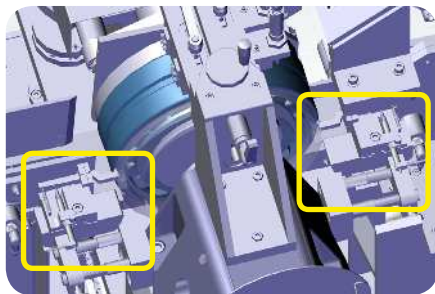


- 1 Control electronics with touch screen
- 2 Control panel and keyboard
- 3 CMME 7000 measuring electronics
- 4 Measuring mechanics
- 5 Inlet chute
- 6 Sorting unit
- 7 Pneumatic cabinet

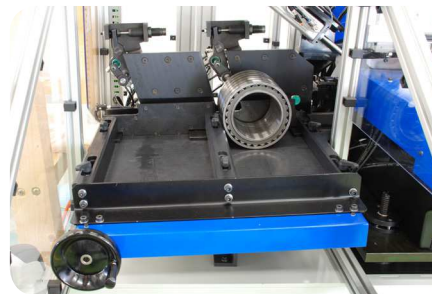
MVS 270A



Measuring station – noise testing pickups



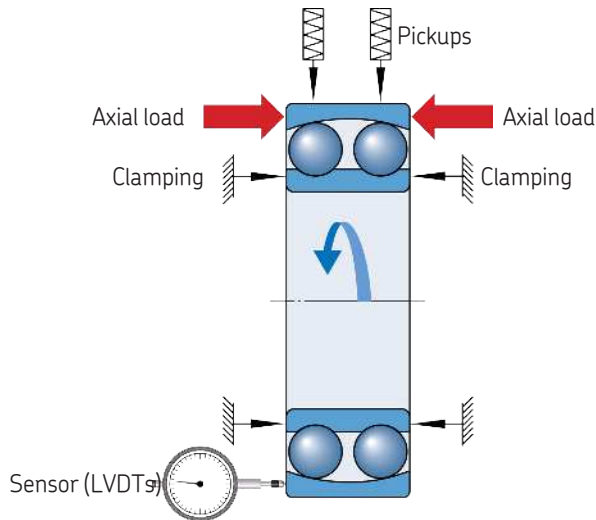
Measuring station – axial clearance sensors



Sorting station

Functional principle

During measurement, the inner ring of the bearing is rotated on a high-quality spindle. An axial load is applied to the outer ring. The axial load is changed during measurement from one side to the other. On a two-row bearing, this means that first one side and then the other will be loaded, with the radial vibrations being measured by two pickups, one for each side. During measurement, connection is made to



the pickup which is placed over the loaded side. The vibration signal is analysed in the CMME 7000 electronics.

Clearance is measured by means of two displacement gauges or Linear Voltage Differential Transducers (LVDTs). The gauges measure the displacement between the two axial positions of the bearing during the load change. Two gauges are used to compensate for a possible angular change of the outer ring. Although axial measurements are carried out, it is possible to recalculate to radial clearance.

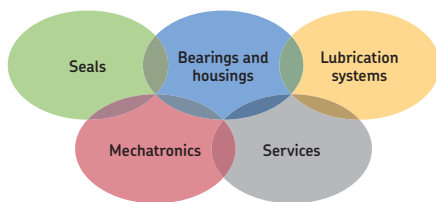
Signals from pickups and gauges are thus analysed in the CMME 7000. Tolerances, limits etc. for several bearing types can be stored in the electronics, as well as control limits. Loading and unloading, measurement and sorting are done fully automatically. The automatic handling is controlled by the control system.

There are several possible ways of sorting out bearings in the two/three rejection chutes. Selection takes place via the electronics and the Siemens PLC control system.

Technical specifications

- Mechanics
 - Working range, outer diameter:
 - MVS 130D: 52 to 130 mm (2.05 to 5.12 in.)
 - Up to 160 mm (6.30 in.) optionally available
 - MVS 270A: 90 to 270 mm (3.54 to 10.63 in.)
 - Resetting time: Approx. 9 min.
 - Cycle time:
 - MVS 130D: Approx. 12 s (at 130 mm outer diameter)
 - MVS 270A: Approx. 15 s (at 240 mm outer diameter)
 - Axial test load:
 - MVS 130D: Adjustable 300 to 600 N
 - MVS 270A: Adjustable 300 to 1 400 N
 - Spindle speed:
 - MVS 130D: 1 800 r/min +/- 10 r/min
 - MVS 270A: 700 r/min +/- 10 r/min
 - Driving motor: 3 phases (frequency-controlled)
 - Tools: One mandrel per bearing inner ring bore, one loading tool per bearing outer ring diameter
 - Paint: Light creamy grey RAL 7035, optionally other colours available
- Electronics
 - Measuring electronics: CMME 7000; for details see datasheet CMME 7000
 - MEA 200 pickup: Frequency range 20 to 10 000 Hz, measuring range up to 10 000 µm/s
 - Software: FPM, operating system Windows 7; for details see datasheet FPM
 - Loudspeaker (option): MEB 122C
 - Control equipment: SIEMENS PLC
 - Environmental protection: IP 53
- Dimensions
 - Dimensions (H x W x D):
 - MVS 130D: 1 810 to 2 110 x 1 250 x 1 670 mm (71.3 to 83.1 x 48.2 x 65.7 in.)
 - MVS 270A: 1 476 to 1 942 x 2 474 x 1 806 mm (58.1 to 76.5 x 97.4 x 71.1 in.)
- Requirements
 - Electrical system: See rating plate
3 x 400 V/50 Hz/2 kVA, 3 x 480 V/60 Hz/2 kVA
 - Pneumatic system:
Air pressure: 6 bar (87 psi) at least, clean and dry air
- Calibration tools ¹⁾
 - Sensor calibration tool MEA 6A: To calibrate the sensor and electronics
 - Digital load cell: To calibrate the axial bearing load
 - Alignment tools: To calibrate the alignment of the loading unit and the spindle axis
 - Spring balance 0 to 100 N: To calibrate the belt tension
 - Tachometer: To calibrate the spindle speed
 - Superball and reference bearings 6209-2Z for spindle check: VK2

¹⁾ One set per factory recommended



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Technical specifications subject to change without notice.
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